



DEPARTMENT OF TRADE AND INDUSTRY
OFFICE OF SCIENCE AND TECHNOLOGY

Technology Foresight

**Government Response to the First Report of the
House of Commons Select Committee on
Science and Technology
1994-95 Session**

*Presented to Parliament by the President of the Board of Trade
by Command of Her Majesty
April 1996*

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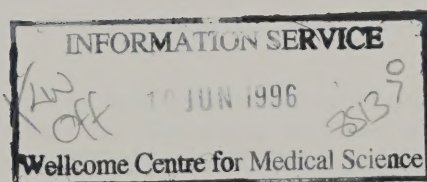
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SCIENCE AND TECHNOLOGY COMMITTEE REPORT ON
TECHNOLOGY FORESIGHT

INTRODUCTION

1. The Government welcomes the continuing interest which the Select Committee pays to initiatives announced in the 1993 White Paper "Realising our Potential". It is grateful for this report which comments and makes recommendations on two major initiatives: the Technology Foresight Programme and the Forward Look. The Government predominantly accepts the Committee's views.

2. The Committee also comments on the transfer of the Office of Science and Technology (OST) to the Department of Trade and Industry (DTI) in July 1995. The Government is grateful to the Committee for its reasoned opinions on the implications of this machinery of government change.

TRANSFER OF THE OST TO DTI

3. The Government welcomes the Committee's view (paragraph 9) that the transfer of the OST to the DTI could bring a more integrated system in which the White Paper priorities of increasing the links between academe and industry can be carried out. OST, and DTI generally, are acting to enhance the links between the science and engineering base and industry through the mechanisms available within DTI. In particular the Department's sector divisions and Government Offices are helping to make firms more aware of what the science and engineering base has to offer and are disseminating the messages of Technology Foresight. The DTI R&D Scoreboard indicates that too many British companies have not fully understood the importance of long-term research and development. One of DTI's tasks in working with the OST is to give industry and investors a better understanding of the value of the science and engineering base. OST is also working closely, as appropriate, with other relevant DTI divisions on some transdepartmental policy issues such as biotechnology and space.

4. The Government welcomes the Committee's agreement that much publicly funded research should be directed to topics where industry might have an interest. This poses no threat to the science and engineering base: the Government does not intend that it should become simply a research consultancy dedicated to industrial problem solving. On the contrary, stronger links with industry should act as a spur to efforts in basic research to promote greater wealth creation and enhanced quality of life.

5. The Government notes the Committee's concern at the lack of a post of Chief Scientific Adviser within the Department of Trade and Industry (paragraphs 17-19). Dr David Evans, DTI's Director Technology & Standards, provides advice to the Department on science, technology and innovation matters and represents DTI on the Cabinet official Committee on Science and Technology chaired by Sir Robert May. In 1994, restructuring of the Department brigaded Dr Evans's division with the DTI industry sector divisions, under one Deputy Secretary Command. This was one of a number of measures, taken with the full support of the outgoing Chief Adviser on Science and Technology, Dr Robinson, designed to give greater importance to technology and innovation by integrating it more fully with the DTI's key work on promoting industrial competitiveness.

TECHNOLOGY FORESIGHT

6. The Committee comments favourably on the Technology Foresight Programme. The Government is grateful for the Committee's close interest and

support. Up to date information about the Programme is contained in the Progress Report on Technology Foresight published on 6 March¹. This covers several areas of interest to the Committee such as the continuing work of panels, the role of professional and industry bodies and the action being taken to address 'infrastructure' issues. This response therefore concentrates on specific recommendations which the Committee makes for the further conduct of the Programme.

Panel membership and structure

7. The Government agrees in principle with the Committee's view (paragraphs 34 and 35) that the Foresight panels should now experience stability and continuity. There are no plans for early changes to the structure or number of panels. The success of the panels will lie in the extent to which they generate self-sustaining Foresight networks between the science and engineering base and firms in their sectors. OST is monitoring panels' progress and, taking account of this, will consider over the next year how their role should develop. In sectors which have very strong links between industry and the science base, it may not be necessary formally to keep panels in being in the longer term. The position is likely to vary sector by sector. Generally, there may be a case for Government departments or trade associations and professional institutes taking on more formal responsibility for panels in their sectors. The Government will consider these issues over the next year, consulting closely with the Steering Group and with panel chairmen.

Role and composition of the Steering Group

8. The Government notes the Committee's recommendation (paragraph 37) that the Steering Group should be given specific responsibility for oversight of panel membership. The Steering Group advises on the conduct of the Programme as a whole, so it already has a general locus to comment, if it wishes, on panel composition. However the Government believes that panel membership should continue to be a matter on which panel chairmen have a large degree of discretion. OST, as programme manager, maintains oversight of panel membership and has made, and will continue to make, suggestions to chairmen from time to time. Steps have for instance been taken recently to strengthen Research Council representation on panels. The Government accepts the recommendation (paragraph 39) that serious consideration be given to adding someone with expertise related to the sectors underpinned by biological science to the Steering Group; an additional appointment will be made shortly.

Networks

9. The Government is grateful for the Committee's endorsement (paragraphs 40–43) of the network building activities of the Programme. OST does regard itself as an active participant in the process, not just an overseer, and provides support for network building activity. For instance the panel secretaries provided by OST are themselves often instrumental and participate directly in dissemination events and networking by their respective panels. Members of the OST Foresight Team have also actively encouraged network building events by other organisations and have for example addressed or participated in at least 100 seminars and conferences on Foresight since March 1995. The Foresight Newsletter, published approximately every two months by OST, issues to some 12,000 people, thereby contributing to network building. Further publicity initiatives by OST are planned. In addition, networking is now substantially enhanced by the DTI's Foresight Networking Programme worth approximately £2 million, over the years 1995/96–1996/97. This Programme, managed by DTI's sector divisions and Government Offices, will promote dissemination of Foresight to, and encourage its implementation by, industry. Regional Foresight Networking activities will aim, in particular, to involve smaller companies at the local level. In his speech to the CBI Council on 6 March, launching the Progress Report, Mr Ian Taylor re-emphasised the importance of business participation in the Foresight Programme.

Dissemination

10. As recommended by the Committee (paragraph 50), the Steering Group will be kept informed about progress with dissemination and, if gaps appear, OST and other parts of DTI will seek to address them. One large-scale example of this is the recent establishment of the Marine Panel which fills a gap perceived by the original Agriculture, Natural Resources and Environment Panel and the Steering Group during the first phase of the Programme.

Finance

11. The Committee refers (paragraph 51) to its earlier concern that the UK's financial system does not adequately support innovation and that one problem often identified was poor communication. Well-managed innovative companies do not appear to have difficulty financing their innovations, provided that they communicate their strategy to their investors. The DTI's Innovation Unit is working with investors and companies to help improve communication and mutual understanding. For example, the Unit facilitated a Working Group of senior industrialists, institutional investors and their professional advisors under the chairmanship of Paul Myners, Chairman of Gartmore plc. The Group's report² pointed out that over the last ten years there had been some improvement in developing longer term relationships between investors and companies, but that much more could be done. It set out models of best practice for this relationship, addressed to investors, companies and trustees of pension funds who play a key intermediating role in determining the long-term strategy for investment.

12. The Government welcomes the Committee's recommendation (paragraph 51) that members of the financial community should be involved in local and regional Foresight dissemination initiatives. The appointment of an Executive Director of the Bank of England to the Steering Group should help in this. Panels already make efforts to reach audiences wider than practitioners in science, engineering and technology. The Government is however continuing to develop ideas for extending Foresight dissemination and networking to a wider spectrum of business management, including the financial community.

13. The Committee also refers (paragraph 52) to its earlier conclusion that the financial system in the UK is risk averse and inclined to rely too heavily on short-term financial measures. The Myners Group concluded that companies and investing institutions now needed to put the "short-termism" debate behind them and concentrate on working together better. The National Association of Pension Funds³ has estimated that the average holding period for any given share in a fund portfolio is over eight years. A recent Bank of England "Finance for Small Firms"⁴ report suggests that relationships have been improving over the last few years and that much effort has been made to provide appropriate financial packages. The Government agrees with the Committee that further research is needed to understand managerial and financial approaches to business risks associated with innovation. At least three of the Economic and Social Research Councils' new thematic priorities—economic performance and development; globalisation, regions and emerging markets; and innovation, organisation and business processes—will be relevant to this.

Implementation of Foresight recommendations

14. The Committee sees the work of the Whitehall Foresight Group as a key indicator of the extent to which OST is successful in coordinating transdepartmental policy from within the DTI (paragraph 57). The Group is making solid progress in addressing issues which are the responsibility of DTI and other departments, as outlined in the recent Progress Report. The DfEE initiative on skills and training with the National Council for Industry Training Organisations and the Science, Technology and Mathematics Council is one example.

15. The Government agrees with the Committee (paragraph 60) that Foresight should not be used in too directive a way with respect to the Research Councils. Foresight is an important factor bearing on Research Councils' priorities but it is not the only one. Councils' continuing interactions with academic and user communities are very important. Nor must Councils neglect their duty to support responsive-mode funding. The Government has made clear that research excellence is a prime criterion for selecting basic and strategic research and that Foresight is only one of several criteria used to determine priorities.

16. The Government agrees with the Committee (paragraph 65) that, while ROPAs may not be subject to conventional peer review, they should be awarded only for high quality proposals. In both the pilot and the 1995 schemes, the majority of ROPA grants went to the most highly-rated departments: 67 per cent of grants to departments within the scope of the university research assessment exercise went to those rated 5 or 4, the top two ratings. For all Councils, bar one, 5-rated departments were the most frequent recipients of ROPAs. The report⁵ of a review carried out in 1995 recommended that, in any future rounds of the ROPA scheme, assessment panels should consist of a mix of academics and members from industry or commerce. Councils plan to make use of referees in line with the report: EPSRC and BBSRC, which have a wide spread of research areas, will use appropriate individual referees whereas ESRC, MRC, NERC and PPARC will use panels of experts supplemented as necessary by further referees.

17. The Government notes the Committee's recommendation (paragraph 66) that expenditure on ROPAs, as a percentage of the Science Budget, should not be significantly increased until the scheme is proven. The 1996-97 ROPA competition was announced in the Allocation of the 1996-97 Science Budget in January, and is expected to result in additional expenditure of £6.2 million in 1996-97, which represents approximately 0.47% of the Science Budget. The anticipated total expenditure on ROPAs in 1996-97 will be £32.1 million. The extent of future funding to new rounds of the ROPA scheme cannot be determined at this stage; it will depend on the level of future Science Budgets, competing priorities for funds and other factors.

18. The Committee recommends (paragraph 69) that at least a third of the budget for Foresight Challenge awards be reserved for second round proposals. It adds that high quality proposals which could not be funded in the first round could be reconsidered in the second. Ministers are closely guided on the allocation of funds by advice from the Foresight Challenge Awards Group chaired by the Chief Scientific Adviser. The Group does not consider it appropriate to withhold a fixed proportion of funding from the first to a second round. Rather, any such amount should emerge flexibly in the light of the quality of bids received. It will be open to unsuccessful bidders from the first round of the competition, if they wish, to resubmit proposals for a second round.

Resources

19. The Committee recommends (paragraph 73) that future Foresight activity be adequately financed and supported and that OST should seek to establish the appropriate level of funding. The Government believes that, having regard to the overall OST running cost budget, the level of resource provided for directing the Technology Foresight Programme (about £2 million in 1995/96) is broadly adequate and will enable the Programme to be taken forward effectively.

20. The main thrust of Foresight-related programmes and projects should be within the Research Council, departmental, university and industrial research budgets. The Foresight Programme itself has been extended with Foresight Challenge funding (up to £30 million of public funds over the next four years in the

first round of the competition, to be matched by at least equal funding from the private sector) and with dissemination initiatives funded through DTI sector divisions and Government Offices (£2 million over the next two years). It will also be complemented by relevant initiatives funded from elsewhere in DTI, by other Government departments and by the Research Councils. For example, new LINK programmes already offer some £35 million from the public sector toward collaborative partnerships with companies. The new DTI-led Information Society Initiative, also worth up to £35 million plus at least matching private sector funds, will help deliver Foresight recommendations in the fields of information technology, electronics and communications, with a particular focus on small and medium-sized enterprises.

Future Foresight Surveys

21. The Committee makes a number of recommendations (paragraphs 77–84) about the future conduct of any Delphi or other large scale Foresight questionnaire survey. In particular it recommends that greater attention be given to the timing and tailoring of any such surveys and to more involvement of young researchers. It also recommends that such large scale surveys should be undertaken at least once a decade. The Government notes the Committee's recommendations and will consider them further in the light of developing experience.

FORWARD LOOK

22. The Government agrees with the Committee (paragraph 86) that the annual Forward Look of Government-funded Science, Engineering and Technology should help ensure that Technology Foresight is implemented in Government departments. The Forward Look reports on progress in implementing the initiatives announced in the 1993 White Paper "Realising our Potential". Technology Foresight is one of the key initiatives. In the 1996 Forward Look each department and Research Council will describe briefly its response to Foresight.

23. The Government notes the Committee's recommendation (paragraph 88) that the OST should consult users, including the Committee, before any major changes are made to the Forward Look. It is keen to produce a Forward Look which is as useful as possible to the main readers. The changes it proposes are evolutionary. The Government proposes that the 1996 Forward Look will be more concise, focusing on strategic and forward-looking material. Full statistical data will continue to be provided, but in a separate volume. Mr Ian Taylor has written to the Committee about this. The Council for Science and Technology has also been consulted. A readership survey form will be included in the 1996 Forward Look; feedback from this will inform the content and presentation of future Forward Looks.

24. The Committee expresses concern (paragraphs 89 & 90) about the presentation of information on DTI's expenditure on innovation. At the time of preparation of the Committee's report the outcome of last year's Public Expenditure Survey was not known. The Department is now in a position to set out the 1995 PES figures for the DTI support of innovation and technology. They are given in the table below. These data will be used in both the 1996 Departmental Report and the DTI statement in the 1996 Forward Look. (They do not include support for energy, space or civil aviation, which are not funded out of the Innovation and Technology Support budget; those expenditure lines will however be shown in the breakdown of overall DTI S&T spend to be given in the 1996 Forward Look.)

DTI Innovation and Technology Support: Plans for 1996/97 to 1998/99

Figures in £ million

	1994/95 Outturn	1995/96 Estimated Outturn	1996/97 Plan	1997/97 Plan	1998/99 Plan
Innovation & Technology					
Support, of which:	195.8	181.9	187.1	179.3	174.6
Innovation Climate	3.0	9.2	9.7	9.1	8.8
Best Practice	13.8	18.2	21.0	20.8	20.4
Technology Access	27.5	35.7	48.8	48.9	47.6
Technology Development	90.8	67.3	58.9	54.8	53.1
Statutory/Regulatory & Standards	63.1	54.9	53.7	50.4	49.2
Innovation Receipts	-2.4	-3.4	-5.1	-4.7	-4.6

25. The Committee recommends (paragraph 91) that departments should provide, for the Forward Look, at least those details of planned expenditure which are already available elsewhere. Departments have been requested to provide more detailed forward information and this will be included in the Forward Look as appropriate. The information on departmental expenditure is collected for the Forward Look on a consistent basis across all departments. It is not always appropriate for departments to use exactly the same definition in their annual reports; furthermore, departmental programme plans develop over the period following the November Budget, and the deadline for departmental reports is earlier than for the Forward Look. Where there are unavoidable differences between departments' figures for their expenditure plans in the Forward Look and their annual reports, OST will if possible provide an explanation in the Forward Look.

26. The Committee recommends (paragraph 92) that details of funding allocated to schemes such as LINK should be given in the Forward Look. A table of departmental expenditure on LINK will be included in the 1996 Forward Look.

27. The Government notes the Committee's view (paragraph 93) that it is reasonable to economise on the presentation of information in the Forward Look as long as there is no diminution in the document's content. It does not propose that any important long-term datasets will be discontinued in the statistical volume; however, which data are to be displayed needs to be kept under review, from year to year, in the light of changing policy requirements.

28. The Committee trusts that complete statistics on the Higher Education Funding Councils will be available next year and that the Councils will have an appropriate entry in the 1996 Forward Look (paragraph 94). The 1995 Forward Look provided significant information about overall spending on HE research. But, because of major changes to the higher education system, a breakdown of that support by subject was not available in time for the 1995 Forward Look. These details will be provided in the 1996 edition, and information on HEFC research spending will be presented in a separate section rather than being subsumed within the Education Department entries as in 1995.

29. The Committee is pleased that OST is attempting to encourage the development of meaningful output measures of the effectiveness of research and development (paragraph 95). Work on this is continuing with departments and Research Councils. To be meaningful and useful, such measures must be of interest both to OST and others in assessing the relative performance across SET expenditure and to departments and Research Councils themselves as management tools. This requires a combination of short term process measures and longer term output measures. Progress on output measures will continue to be reported in future Forward Looks.

30. The Committee recommends in particular that OST examine total factor productivity as a possible way of measuring the success of investment in research and development (R&D). The Government pays attention to the many studies which have examined the effect of R&D on economic performance. Departments are at present considering recent reviews of research in this area with a view to determining what further work needs to be done. OST and DTI generally will take account of the Committee's views on total factor productivity in those deliberations.

31. The Government accepts the Committee's recommendation (paragraph 96) that figures for Business Expenditure on Research and Development (BERD) by industrial sector, expressed in real terms, should be provided in the Forward Look. These will be summarised by broad product groups in the 1996 edition, with detailed data in the statistical companion volume.

32. The Government accepts the Committee's recommendation (paragraph 97) that figures giving details of European Framework funding received by institutions in the public and private sectors should be published each year in the Forward Look and that OST should seek to improve the completeness and accuracy of these figures. Details of EU receipts by major sectors will be provided this year.

33. The Government accepts the Committee's recommendation (paragraph 98) that the percentage attribution to departments of the cost to the UK of EU R&D should be given in future editions of the Forward Look. This information will be provided in the 1996 Forward Look.

34. The Government notes the Committee's view (paragraph 99) that the comprehensiveness and clarity of the information contained in future Forward Looks will reveal the extent to which the OST can influence other departments. It remains the Government's intention that the Forward Look will form the basis for better informed decisions between competing priorities, which can help to underpin the Public Expenditure Surveys.

35. The Government accepts the Committee's recommendation (paragraph 100) that in future the Forward Look should be laid before the House. It welcomes the opportunity to raise the Parliamentary profile of this important document. Future editions of the Forward Look will be published as Command Papers.

CONCLUSION

36. The Government is committed to carrying forward the Technology Foresight and Forward Look initiatives. It is pursuing these initiatives vigorously in consultation with the industrial and academic communities.

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